

App. No. 10/712,367

Reply to Office action of December 8, 2004

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REMARKS/ARGUMENTSA. Summary of the Amendment

This is a full and timely response to the non-final Office Action dated December 8, 2004. Reexamination and reconsideration are courteously requested. By way of the present amendment, claims 30, 34, 43, and 47 are amended. Further, claims 31 to 33, and 44 to 46 are canceled. Thus, claims 10, 34 to 43, and 47 to 53 remain pending for the Examiner's consideration, with claims 30 and 43 being independent claims.

The specification is also amended at paragraph [0001] to add the filing date of the parent U.S. application to which priority is claimed.

B. Rejections Under 35 U.S.C. § 102

Claims 30 to 31, and 43 to 44 are rejected as being anticipated by U.S. Patent No. 6,099,394 ("James"). Claims 30 to 31, 34, 36 to 37, 43 to 44, 47, and 49 to 50 are rejected as being anticipated by U.S. Patent No. 5,958,794 ("Bruxvoort"). Claims 30 to 31, 34, and 36 are rejected as being anticipated by U.S. Patent No. 3,850,589 ("Charvat 589"). Claims 30 to 31 are rejected as being anticipated by U.S. Patent No. 5,110,322 ("Narayanan"). Finally, claims 30 to 31, 34, and 36 are rejected as being anticipated by U.S. Patent No. 4,588,420 ("Carvat 420").

These rejections are respectfully traversed for the reasons set forth below. The same reasoning pertains to the Examiner's alternative rejection of the same claims as being unpatentable over the same references under 35 U.S.C. § 103(a).

Each of the cited prior art references fails to teach or suggest a unique set of features included in the amended independent claims. Pending independent claim 30, directed to a polishing article for chemical-mechanical polishing a workpiece, recites a substantially uniform mixture that includes, among other things, a low weight:weight ratio between a binder resin

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compound and a friable filler material. More particularly, the polishing article is constructed with the resin included at a concentration that is between about 5% and about 15% by weight of the filler material. Having the friable filler material at a high concentration with respect to the binder resin causes the polishing surface to continually wear during polishing, and thereby facilitates continuous exposure of the abrasive. Likewise, independent claim 43, directed to a method for chemical mechanical planarization of a workpiece surface, recites a polishing step using a polishing article that includes the friable filler material and resin. The references cited in the Office Action fail to teach a friable filler and/or that the resin is between about 5% and about 15% by weight of the friable filler. Each reference, and the features disclosed by each, will be discussed separately.

1. James Patent

James fails to teach or suggest that a polishing article includes a *friable* filler material. James discloses a polishing article that includes, among other things, a filler (col. 7, line 4), but does not disclose the properties that the filler possesses. James does mention that clusters of high modulus material and binder can be manufactured as a friable composition (col. 8, lines 18 to 33) by including fillers at a high concentration, which causes the binder to poorly adhere the abrasive particles to each other. However, the fillers themselves are not taught or suggested to be friable.

Clearly, James fails to teach or suggest that a filler in a polishing article is a friable material. Further, James fails to teach or suggest the unique ratio between the friable filler and the binder resin. For at least these reasons, the rejections of claims 30 to 31, and 43 to 44 should be withdrawn.

2. Charvat 589 Patent

A notable difference between Charvat 589 and the present invention is that Charvat does not disclose an article that has "a polishing surface for performing chemical-mechanical polishing" as recited in the claims. Charvat 589 is directed to a grinding wheel that has an edge suited to cut through cast iron or steel. Thus, Charvat fails to disclose that the wheel has a surface suited for performing chemical-mechanical polishing, or that the polishing surface is

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constructed "to continually wear during polishing and thereby facilitate continuous exposure of the abrasive" during polishing as recited in independent claim 30.

Charvat 589 also fails to teach or suggest that a polishing article includes a friable filler material. Charvat 589 discloses a polishing article that includes, among other things, a filler material (col. 9, line 44 to col. 10, line 9). Exemplary filler materials include mica, graphite powder, iron pyrites, silicon carbide, and aluminum oxide. Most of these fillers are very hard materials; others of these fillers may be relatively soft, but they are not necessarily friable materials.

Further, Charvat 589 fails to teach or suggest that a resin having at least one epoxy group is included at a concentration that is between about 5% and about 15% by weight of the filler material, causing the polishing surface to continually wear during polishing, and thereby facilitating continuous exposure of an abrasive. For at least these reasons, the rejections of claims 30 to 31, 34, and 36 should be withdrawn.

3. Charvat 420 Patent

Like the Charvat 589 patent previously discussed, Charvat 420 discloses grinding wheels that are adapted to make rapid cuts in very hard materials such as steel and cast iron. Clearly, Charvat 420 fails to disclose a polishing article. More particularly, Charvat 420 fails to teach or suggest a polishing article that has "a polishing surface for performing chemical-mechanical polishing" or that a polishing surface is constructed "to continually wear during polishing and thereby facilitate continuous exposure of the abrasive" during polishing as recited in independent claim 30.

Charvat 420 also fails to teach or suggest that a polishing article includes a friable filler material. Charvat 420 discloses a polishing article that includes, among other things, "various discrete inert filler materials such as mica, graphite powder, iron pyrites, quartz, titanium dioxide, cryolite, feldspar, cerussite, olivine, gypsum, clay, etc." (col. 13, lines 21 to 26). Most of these fillers are very hard materials; others of these fillers may be relatively soft, but they are not necessarily friable materials.

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Further, Charvat 420 fails to teach or suggest that a resin having at least one ~~any~~ epoxy group is included at a concentration that is between about 5% and about 15% by weight ~~of the~~ filler material, causing the polishing surface to continually wear during polishing, and ~~thereby~~ facilitating continuous exposure of an abrasive. For at least these reasons, the rejection ~~of~~ claims 30 to 31, 34, and 36 should be withdrawn.

4. Narayanan Patent

Like the Charvat patents, Narayanan is directed to grinding wheels, and not ~~polishing~~ articles for performing chemical-mechanical polishing. Thus, Charvat fails to teach or suggest a polishing article that has "a polishing surface for performing chemical-mechanical polishing" or that a polishing surface is constructed "to continually wear during polishing and ~~thereby~~ facilitate continuous exposure of the abrasive" during polishing as recited in independent ~~claim~~ 30.

Narayana does disclose that a grinding wheel includes a friable filler material (col. 2, lines 57 to col. 3, line 2; col. 4, lines 1 to 7), but fails to teach or suggest that a resin having at least one epoxy group is included at a concentration that is between about 5% and about 15% by weight of the filler material, causing the polishing surface to continually wear during polishing, and thereby facilitating continuous exposure of an abrasive. For at least these reasons, the rejections of claims 30 to 31 should be withdrawn.

5. Bruxvoort Patent

Bruxvoort discloses a chemical mechanical polishing article (claim 1) that includes abrasive particles in an epoxy resin binder (col. 18, lines 16 to 18; col. 24, lines 4 to 24). The polishing article also can include filler particles such as calcite, talc, and gypsum (col. 21, line 46 to col. 22, line 18). However, Bruxvoort fails to teach or suggest that a resin having at least one epoxy group is included at a concentration that is between about 5% and about 15% by weight of the filler material, causing the polishing surface to continually wear during polishing, and thereby facilitating continuous exposure of an abrasive. For at least these reasons, the rejections of claims 30 to 31, 34, 36 to 37, 43 to 44, 47, and 49 to 50 should be withdrawn.

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C. Rejections Under 35 U.S.C. § 103(a)

Each of the dependent claims, 31 to 42 and 44 to 53, is rejected as being unpatentable over some combination of James, Bruxvoort, Chavart 589, Chavart 420 and Narayanan. The various combinations of these references are also combined with U.S. Patent No. 5,584,146 ("Shamouillan") and/or U.S. Patent No. 6,537,134 ("Newell") to formulate further rejections under 35 U.S.C. § 103(a). These rejections are respectfully traversed, essentially for the reasons previously discussed.

None of the prior art cited teaches or suggests a polishing article, or a polishing step using such an article, comprising a resin that has at least one epoxy group and is included at a concentration that is between about 5% and about 15% by weight of a friable filler material, causing the polishing surface to continually wear during polishing, and thereby facilitating continuous exposure of an abrasive. The Office Action addresses the deficiency in the James, Bruxvoort, Chavart 589, Chavart 420, and Narayanan patents, but asserts that the relationship between the amounts of friable filler and the amounts of resin are obvious since the previously discussed references mention the components in general terms. Applicants respectfully note that the relationship between the amounts of friable filler and the amounts of resin are of importance because it provides a construction that, as originally recited in the independent claims, "cause(s) said polishing surface to continually wear during polishing and thereby facilitate continuous exposure of the abrasive." Consequently, the concentration set forth in the independent claims, as amended, are not obvious modifications of the prior art, but provide a surface wear and polishing feature that is neither explicitly disclosed nor inherently part of the prior art.

Neither Newell nor the Shamouillan reference compensates for the deficiencies of the James, Bruxvoort, Chavart 589, Chavart 420, and Narayanan patents. Newell is only cited for its teachings of translucent regions in a polishing pad. Regarding the Shamouillan reference, the Action only cites the teachings therein of conduits fabricated through the polishing pad. Neither reference teaches friable filler materials or a resin that has at least one epoxy group and

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is included at a concentration that is between about 5% and about 15% by weight of a ~~filler~~ filler material. It is therefore respectfully requested that the rejections under 35 U.S.C. § 103(a) be withdrawn.

D. Conclusion


In view of Applicant's amendments and remarks, it is respectfully submitted that Examiner's objections and rejections have been overcome. Accordingly, Applicants respectfully submit that the application is now in condition for allowance, and such allowance is therefore earnestly requested. Should the Examiner have any questions or wish to further discuss this application, Applicants request that the Examiner contact the Applicants attorneys at the below-listed telephone number.

If for some reason Applicants have not requested a sufficient extension and/or have not paid a sufficient fee for this response and/or for the extension necessary to prevent abandonment on this application, please consider this as a request for an extension for the required time period and/or authorization to charge Deposit Account No. 50-2091 for any fee which may be due.

Respectfully submitted,

INGRASSIA FISHER & LORENZ

Dated: MARCH 8, 2004

By: 
David K. Benson
Reg. No. 42,314
(480) 385-5060

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